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## CropWatch No. 97-11, May 30, 1997

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# CROP WATCH

University of Nebraska Cooperative Extension  
Institute of Agriculture and Natural Resources

No. 97-11  
May 30, 1997

*Fertility research validates what farmers know:*

## Crop rotation pays off in many ways

The benefits of crop rotation have been documented for a long time. The crop nutrition benefit from rotation comes from legumes contributing nitrogen to the soil. This benefit may actually add to total soil nitrogen.

Rotation may offer other benefits due to the following processes: Crop roots bringing subsoil nutrients to the surface for other plant species use. Crop roots of one species may be more capable of extracting unavailable forms of a nutrient. When the roots and plants decompose they might release these nutrients in a more readily available form. One crop may leave the soil in better tilth which allows the next crop to have a more extensive roots

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### *Special issue addresses benefits of rotation*

Crop rotation and diversification have been promoted throughout the years to break pest host cycles, reduce disease problems, spread workload and risks, and improve soil and water conservation, among other other reasons. Unfortunately, some government farm programs encouraged widescale corn production. In addition, corn responds favorably to irrigation, further encouraging continuous corn production in Nebraska.

With the "Freedom to Farm" bill, producers no longer have to protect their corn base and may be looking at diversification. This special issue of *Crop Watch* discusses several of the benefits of crop rotation, primarily from a corn/soybean rotation. This rotation is the most common crop production system in the Cornbelt and is widely adaptable across most of Nebraska.

system and remove more nutrients.

Scientists have not been able to fully explain all the mechanisms behind the rotation effects, but most agree that rotations are an important part of a sustainable agricultural system. In Nebraska, recent research focuses on the soybean-corn rotation since that is the most common row crop rotation. The rest of this article will focus on the results of two corn and soybean studies conducted in Nebraska.

The first is a 10-year rainfed study conducted at the Northeast

Research and Extension Center on a Kennebec silt loam. The soil is a bottom land soil with about 4% organic matter. The study has been conducted since 1986 and has tillage and nitrogen treatments in addition to the rotations. It is a collaborative study conducted by myself and Dan Walters, UNL Associate Agronomy Professor. The yield results and annual rainfall are listed in the *table on page 89*. The annual results show

*(Continued on page 89)*



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## Updates

### *Weather web site offers new services*

The High Plains Climate Center (HPCC) is pleased to announce that their web site has been updated and can be viewed at <http://hpccsun.unl.edu>. The updated web site includes links to local, regional, and national climate data sources.

Automated Weather Data Network (AWDN) contour plots of daily and weekly average temperature, total precipitation, average soil temperature, average relative humidity, average solar radiation, and average wind speed are updated daily. Information on climate data archived at the HPCC also can be accessed. Future additions to the web site include digitized photographs from four directions at each AWDN site, along with web access to HPCC On-Line.

**Ken Hubbard**  
Director  
High Plains Climate Center

### *Two new soybean books released*

Two new publications by the National Soybean Research Lab, University of Illinois are available free of charge.

*Guidelines for Integrated Pest Management of Soybean Pests*, 48 pp., by James Sinclair, Marshall McGlamery and Marcos Kogan, provides detailed information on integrated pest management of major pests (insects, diseases and weeds) of soybeans worldwide. Text includes 130 color photos.

*Major World Soybean Diseases, Weeds and Insect Pests: A Pictorial Atlas*, 24 pp., by Marcos Kogan, Michael Irwin, James Sinclair and Fred Slife, includes 130 color

illustrations.

Single copies of each publication are available free from: Publication Sales, OAF, UIUC, 69 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801.

For information on cost of multiple copies, call 217-333-2007.

**Robert Wright, Extension  
Entomologist, South Central  
Research and Extension Center**

### *IPM Field Crop Scout Manual revised*

A newly revised edition of *UNL Field Crop IPM Scout Manual* has

been released. These manuals contain information on identification and crop scouting for pests (insects, weeds and plant diseases), as well as irrigation scheduling and identification of nutrient deficiencies, herbicide injury and other disorders. Crops covered include corn, soybeans, sorghum, wheat, alfalfa, and speciality crops.

Manuals cost \$35 per copy. Send orders with payment (payable to 'University of Nebraska') to Robert Wright, South Central Research and Extension Center, P. O. Box 66, Clay Center NE 68933.

**Robert Wright, Extension  
Entomologist, South Central  
Research and Extension Center**



# CROP WATCH

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Lisa Brown Jasa, Editor

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## Fertility research *(Continued from page 87)*

a wide variation in yields from a 44 bu/acre average in 1995 to a 145 bu/acre average in 1992. Even this wide yield variability which is normal for rainfed agriculture in northeast Nebraska, the yield advantage for corn after soybeans averaged 19 bu/acre.

In 1995, a combination of spring rains followed by hot dry conditions created a situation where the soybean previous crop ground allowed better root penetration and better water and nutrient utilization. The results were a dramatic 56 bu/acre increase. Even when taking this year out of the calculations, the average corn response to soybeans as a previous crop was 15 bu/acre.

The response in favor of rotated corn was consistent, with only one exception. The exception being in 1989 when the continuous corn yielded better than the corn following soybeans. Rainfall was 18.3 inches in 1988 and 15.0 inches in 1989. One reason the continuous corn was better in 1989 was that the previous soybean crop used more water and left the soil drier than the corn ground. Because rainfall was limited in 1989 also, the other benefits of rotation were overshadowed by the moisture deficiencies.

The University of Nebraska nitrogen recommendation for corn after soybeans gives a 45 pound credit for soybeans. If you increase your yield goal appropriately, the increased goal will increase the total nitrogen needed. Yield goals should be based on actual experience.

*Rotating corn with soybeans is a proven way to increase corn yields and reduce nitrogen use. This result is consistent across Nebraska.*

While we recommend a decrease in applied nitrogen, studies have shown that soybeans don't necessarily increase total soil nitrogen levels. However, experimental evidence indicates that corn needs less nitrogen to achieve maximum yields.

The University recommendations also give nitrogen credit to forage legumes grown in rotation. Nitrogen credits for alfalfa on medium and fine textured soils are 150 lbs for good stands (greater than 4 plants/sq ft), 120 lbs for 1.5 to 4 plants/sq ft and 90 lbs for less than 1.5 plants/sq ft. on medium and fine textured soil. On sands reduce nitrogen credit by 50 lbs per acre for each category. Sweet clover and red clover would have a credit of about 80% of that allowed for alfalfa.

A question frequently asked about the corn-soybean rotation is how does the rotation impact nitrogen leaching. To address this concern, Gary Hergert, Norm Klocke and Joel Schneekloth, researchers at the West Central Research and Extension Center near North Platte, are using lysimeters under sprinkler irrigation to monitor nitrogen leachate concentration and quantity. They wrote: "Soil sampling showed significantly

lower residual nitrate-N in corn-soybean than continuous corn. The five-year average corn yield in corn-soybean was 11 bu/A higher than continuous corn (182 bu/acre) with an average of 25 lbs less nitrogen per acre. Flow-weighted yearly soil water nitrate-N ranged from 30 ppm for continuous corn to 38 ppm under corn-soybean but continuous corn leached more soil water (9.6 inches vs 6.3 inches). Continuous corn lost an average of 64 lbs nitrogen per acre during 1991 to 1993 compared to 54 lbs nitrogen per acre for corn-soybean. The research shows that there will always be some nitrate-N loss under any cropping system. Farmers, policy makers, and the public must understand this basic fact about food production and the nitrogen cycle. Nitrogen losses can be minimized with crop rotations that include grain legumes, alfalfa or pasture." (Great Plains Fertility Conference, 1994)

Rotating corn with soybeans is a proven way to increase corn yields and reduce the quantity of nitrogen needed. This result is consistent across Nebraska.

**Charles Shapiro, Extension  
Soils Specialist, Northeast  
Research and Extension Center**

Yields for corn after soybeans and continuous corn and annual rainfall at Concord.

Crop rotation	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Mean
	Yield, bu/acre											
Corn/soybeans	147	135	56	73	108	110	158	100	135	86	145	114
Cont. corn	118	103	44	89	108	102	135	75	109	28	132	95
Rain (in/yr)	32.8	24.8	18.3	15	21.4	30.7	39.6	41.4	26.5	31	31	28.4

# Rotating with soybeans increases profit

There are several agronomic and integrated pest management benefits of rotating corn and soybeans rather than growing continuous corn. Producers looking at the bottom line will probably see economic advantages as well. With the reduced farm program supports, careful analysis of actual expenses and revenues are needed to determine the actual profit potentials.

The University of Nebraska Cooperative Extension publication EC 96-872, *Nebraska Crop Budgets*, can be used to evaluate different crop production systems. For producers considering a corn/soybean rotation as an alternative to continuous corn production, I used the publication to estimate break

even corn yields. I assumed a 45 bu/acre soybean yield as an estimate that an irrigated, first-time soybean producer can achieve and assumed no corn yield increase after soybeans. Using grain prices for harvest delivery as quoted in Aurora on May 19, 1997, the breakeven corn yield would be 187 bu/acre, assuming "average" production costs.

While this is a comparison using a one-time price, producers may be interested in the long-term differences. I used the average November grain prices for the past 22 years and assumed a modest 3% corn yield increase to make the comparison. Assuming the same 187 bu/

acre continuous corn yield and 45 bu/acre soybean yield, the corn/soybean rotation returned \$3.87 more per acre than continuous corn.

Research has shown yield increases for the corn after soybean production of 5% to 15% over continuous corn. However, experience has shown that for some producers it is difficult to consistently maintain corn production above 187 bu/acre. In addition, producers more experienced in soybean production report 50-60 bu/acre yields. All of these factors give more of an economic advantage to the corn/soybean rotation.

**Roger Selley, Extension Farm Management Specialist**

## *Improve timeliness of planting, harvest*

Most continuous corn producers are faced with a battle every year trying to get field operations done in a timely manner. Wet conditions, labor shortages, equipment breakdowns, and other delays shorten planting and harvest seasons. Crops planted beyond the optimal date do not produce to potential. Crops may be growing too fast or weather conditions may not cooperate to get cultivation or ditching done in a timely manner. Drying costs of corn harvested early or losses due to late harvest reduce profits. To reduce problems, many producers oversize their equipment for capacity to handle the short season, costing them money unnecessarily in good years. Crop rotation allows diversification which can extend the season to allow producers to cover more acres in a more timely manner with their existing equipment. This is because the optimal window for

multiple crops is wider than for a single crop.

As an example, a producer using 15-foot wide planter (6, 30-inch rows) can cover about 600 acres of continuous corn in a "long" spring planting season. By adding soybeans to the rotation, about 1000 acres a year could be covered with the same planter because of the extended planting season. Grain sorghum, oats, or wheat further extend the planting season since these crops are not planted at the same time as corn. Likewise, tillage, cultivation, and the harvest seasons can be extended greatly with crop diversification.

Harvest, hauling, drying, and storage costs are reduced when soybeans are added to the rotation. The platform header for soybean harvest is less expensive than a corn head and requires less maintenance. Soybeans yield approximately one-

third the number of bushels per acre that corn does. Combine wear is less because of the reduced flow through the combine. With less grain to haul from the field, producers typically can get by with one less truck and driver during harvest. In addition, only one-third the bin space is needed for on-farm grain storage. Soybeans rarely need drying and require only minimal maintenance during storage, further reducing costs.

Crop rotation adds diversity and spreads the workload, not only for the equipment and field operations but also for scouting, irrigation, marketing, and other management items. A systems approach needs to be taken when planning a rotation scheme to get the maximum benefits of crop rotation.

**Paul Jasa  
Extension Engineer**

# Examine the economics of rotation

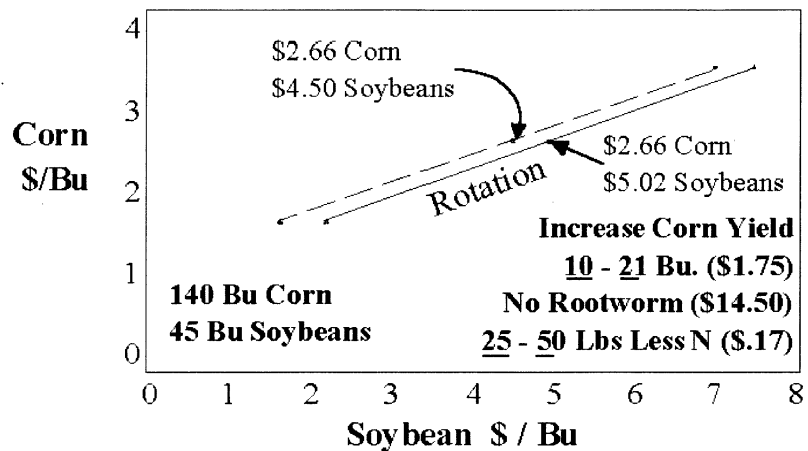
Soybeans in a rotation with corn may reduce the cost of producing the following corn crop. In most situations rootworm insecticide for the corn crop is not needed; however, planter box seed treatment may still be required for seed feeding insects.

Most research shows that corn yields in a corn-soybean rotation are 10 to 21 bu/acre higher than corn yields in continuous corn. The results indicate that the higher yields may be attained with less nitrogen than is needed in continuous corn. The nitrogen benefit to corn after soybeans may be as high as 50 lbs/acre. Nitrogen application to corn can conservatively be reduced 25-40 lb nitrogen per acre.

The estimated cost of producing 45 bu/acre soybeans is \$5.83/bu. If all the credit of the benefits to the corn crop are used to reduce the cost of production for the soybeans, the cost is reduced by  $\$36.25 \div 45 = \$0.81/\text{bu}$  for the low benefits and  $\$59.75 \div 45 = \$1.33$  for the high benefits.

With an estimated cost of producing 140 bu/acre corn at \$2.66/bu the two lines in the figure (the solid line, low benefits — the broken line, high benefits) are where our profit and losses are equal for the rotation. If the price of corn is above the line in relation to the soybean price, grow continuous corn.

**Robert Klein, Extension  
Cropping Systems Specialist  
West Central Research  
and Education Center**



Economics of a corn/soybean rotation

The benefits to a corn crop following soybeans include:

	Low	High
Rootworm insecticide omitted	\$14.50	\$14.50
10-21 bushels of corn — \$1.75/bu	\$17.50	\$36.75
(Value reduced to reflect the extra costs of production)		
25-50 lbs of N = \$0.17/lb	\$ 4.25	\$ 8.50
	\$36.25	\$59.75

## Adding soybeans in rotation

### Advantages:

1. Fixes nitrogen
2. Boosts yield of subsequent cereal
3. Aids in weed, insect, and disease control
4. May reduce land preparation costs
5. Leaves little residue (to interfere with furrow irrigation)

### Disadvantages:

1. May lead to increased erosion on sloping soils
2. May increase herbicide cost in the crop previous to soybeans
3. Leaves little residue (for soil and water conservation)

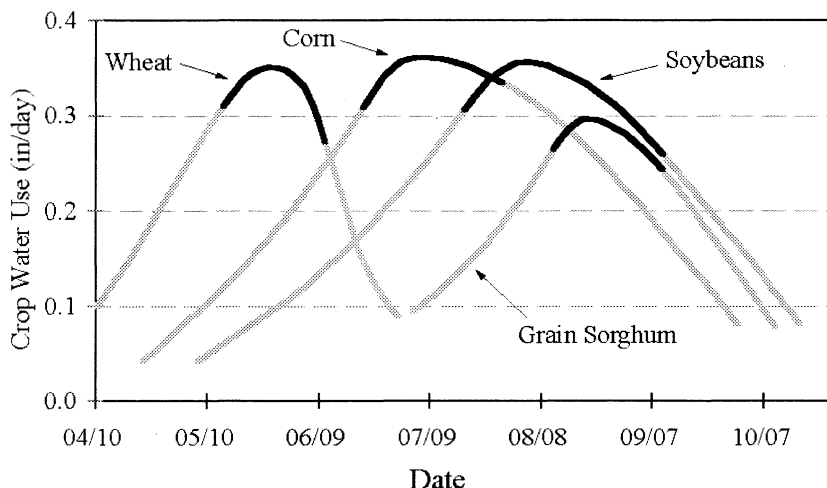
# Rotation offers more efficient water use

Nebraska has about sixteen million acres of harvested row crop production, about half of which is irrigated. Proper irrigation management, in concert with crop rotation, can offer significant benefits to the quantity and quality of one of Nebraska's most precious resources, its water. Proper irrigation can enhance growing conditions by providing the soil moisture necessary to optimize plant growth and yield. Crop rotation can help make better use of both labor and water resources.

When other crops are rotated with corn, total farm irrigation water requirements decrease. Corn is more sensitive to plant water stress than most other field crops. The data in the table document the differences in seasonal crop water use for crops commonly found in Nebraska rotation schemes.

In general, crop water use increases during the vegetative growth period, peaking about when the crop reaches 100% of its fully effective cover. Crop water use generally begins to decline during the reproductive stage and continues to decrease through grain fill and maturity. The figure illustrates crop water use curves for winter wheat, corn, soybeans, and grain sorghum. The most critical periods for irrigation are during the reproductive and grain fill stages. These are illustrated by the darker portions of the crop water use curves. To achieve optimum yields, water stress must be avoided during these periods. For the crops that would

**Seasonal crop water use trends**



Examples of average crop water use during the growing season. Darker portions of curves are periods when it is most critical to avoid moisture stress.

likely be used in a Nebraska rotation scheme, these critical, peak-use periods are spread out during the season. By using different crops in rotation, the timing of peak farm water use can be spread out over a longer period. This permits more effective use of limited water supplies and/or limited irrigation system capacities.

Spreading available water supplies also means spreading the workload for furrow irrigators. Corn requires the first irrigation earlier than either sorghum or soybeans. Corn also must be ditched earlier than sorghum or

soybeans. By using corn, soybean, and sorghum rotations, the demands associated with the first irrigation can be stretched out over a longer time. The management demands associated with rotation must not be ignored. Ditching, laying pipe, and pump operations all must be considered. If two crops are planted in the same field, each crop must be managed according to its water use demands. In general, however, the benefits of rotation offset any additional management inputs.

For center pivot irrigators, if two or more crops are planted in one field, they should be planted in "pie shaped" sections. Each crop can then be watered separately to take advantage of the different water requirements. This will facilitate proper water management. With split fields, the irrigation system must be able to operate in either direction and/or be able to operate empty.

**Seasonal crop water use in Nebraska**

Crop	Western	Central	Eastern
		(inches per year)	
Corn	23 - 26	24 - 27	25 - 28
Soybeans	20 - 22	21 - 23	22 - 25
Sorghum	18 - 20	19 - 22	20 - 23
Winter Wheat	16 - 18	16 - 18	16 - 18

(Continued on page 94)

# Corn-soybean rotation can eliminate need for rootworm insecticide

Probably the biggest benefit of rotation in corn insect management is that it eliminates the need to use a soil insecticide against larval corn rootworms. Of the field crops grown in Nebraska, rootworms can only survive on corn. The importance of using nonchemical controls such as crop rotation increases with the occurrence of insecticide resistant western corn rootworms in areas around Holdrege and York. Crop rotation provides a high level of control of rootworm larvae, and not exposing rootworms to an additional insecticide treatment reduces selection for resistance in the future. Crop rotation is a useful corn rootworm management practice regardless of whether you are in an area with insecticide-resistant rootworms.

It should be noted that two situations (only one occurring in Nebraska) may occur which reduce the benefit of crop rotation for corn rootworm management. Northern corn rootworms have evolved the ability to survive in the egg stage for more than one winter. When this occurs, and corn is planted every other year, eggs laid in corn one year may survive two winters and damage corn after rotation. This characteristic of the eggs has been referred to as 'extended diapause', and has been reported in northeast Nebraska and the northern corn belt, where northern corn rootworms are more common. In Nebraska, economic damage from extended diapause has been relatively uncommon, and is usually restricted to local areas. Throughout much of Nebraska northern corn

rootworms are relatively uncommon. Extended diapause in the egg stage has not been reported from western corn rootworms.

You may be familiar with a situation in Illinois and Indiana, where western corn rootworms are damaging corn after soybeans. This is not due to extended diapause of the eggs, but rather to a change in the egg laying habits of the adults. Rootworm beetles are laying eggs in soybeans; these eggs hatch after one winter, and if a corn-soybean rotation is used, rootworm larvae will damage first year corn. The affected area has been using a corn-soybean rotation for decades. This circumstance has not been documented outside of Illinois and Indiana, and should not be a concern in Nebraska.

*(Continued on page 95)*

## Weather update

	Precipitation (%=percent of average) 5/12-5/26				GDD accumulation for medium maturity wheat 9/1-5/26			GDD accumulation for corn ending 5/26/97			
	Act.	%	Act.	%	Act	Normal	% +/-	Emer date	Act	Normal	% +/-
Ainsworth	0.59	74	12.07	96	622	764	-8	5/19	70	95	-1
Alliance	0.67	91	5.85	65	687	725	-2	5/18	68	95	-1
Beatrice	0.23	25	9.32	54	888	1042	-8	5/14	148	182	-1
Concord	2.32	248	12.17	76	613	832	-12	---	---	---	---
Elgin	1.25	143	9.92	68	624	825	-11				
Holdrege	2.55	280	11.76	89	883	948	-3	5/13	135	168	-1
								5/18	60	112	-2
McCook	0.95	113	8.84	77	962	905	3	5/15	128	141	0
								5/19	68	97	-1
Mead	0.24	25	6.36	37	824	975	-8	5/17	123	140	-1
North Platte	0.46	57	10.46	100	887	870	1	5/15	119	138	-1
								5/19	68	97	-1
Ord	0.79	87	9.24	62	756	898	-8	5/15	121	147	-1
Red Cloud	0.94	102	9.16	67	909	952	-2	---	---	---	---
Scottsbluff	2.09	311	5.44	63	766	736	2	5/18	79	97	-1
Sidney	1.02	144	6.86	74	806	776	2	5/18	62	97	-1
York	0.94	100	8.44	52	810	937	-6	5/15	144	155	0



# Match tillage system to crop rotation

Many of the state's continuous corn acres are farmed using a disk-based tillage system, or in the case of furrow-irrigated acres, many are under a continuous ridge till system. Growing soybeans in rotation with corn allows producers to change their tillage practices, saving fuel and labor, and implement tillage rotation.

Historically producers have performed several tillage operations to reduce the amount of residue remaining after corn production. Many, particularly furrow irrigators, shred their corn stalks to further aid in residue breakdown. By adding soybeans, a low residue crop, to their rotation, tillage operations and shredding to reduce residue can be eliminated.

Many continuous corn producers are not comfortable with adopting a no-till production system. Soybean residue, well distributed behind the combine, is easy to no-till into. The soil and water conservation benefits of no-till can be realized when the corn is no-tilled into the soybean residue. When planting soybeans into corn residue, a reduced tillage system can be used to maintain some of the erosion control benefits due to crop residue management.

A dryland producer in eastern Nebraska I have worked with is using tillage rotation and crop rotation to aid his weed control program. After several years of good weed control management practices, he has reduced his herbicide application greatly. He disk incorporates Treflan into corn residue before planting his soybeans to control grasses with an inexpensive herbicide treatment. He no-tills his corn into soybean residue and sprays postemerge with 2,4-D for economical broadleaf weed control. With crop cultivation, he is managing weeds with only two herbicides across the two-year rotation.

Even furrow irrigators who ridge-till can benefit from no-tilling into soybean residue. Usually, the ridges are not rebuilt as high in soybeans so that the lower pods are not covered, interfering with harvest. No-tilling corn on top of the ridges preserves the ridge height as much as possible and the ridges can be rebuilt to full height easily when cultivating the corn since the soil following soybean production is loose and mellow. Furrow irrigation is much easier because very little soybean residue remains to interfere with water flow. Furrow irrigating

## Irrigation

*(Continued from page 92)*

From a water use perspective, another benefit of crop rotation is the potential for soil moisture conservation. Over the growing season, soil evaporation can account for as much as 20% to 30% of total water use. Crop residues in a no-till rotation, especially wheat stubble, can suppress evaporation when the residue is left on the soil surface. Suppressing evaporation is especially important, and most effective, early in the season before the crop canopy closes, shading the soil surface.

Understanding the relationships between plants and the environment in which they grow is essential for effective management. The characteristics of the soil, the plant, and the irrigation system must be considered. Rotation takes advantage of each crop's natural characteristics to stretch both water and labor resources.

**Brian Benham**  
Water Management Engineer  
South Central Research and  
Extension Center

soybeans is also easier because the corn residue has more time to break down before irrigation is necessary.

In many areas of the state, wheat or oats could be used in the rotation to allow time to address specific concerns in the field which may be difficult to deal with in continuous corn production. Terrace or waterway construction and/or maintenance could be performed in the summer after small grain harvest. In the fallow period after harvest, drainage could be improved or the field could be leveled for furrow irrigation. Tillage to reduce compaction could be performed in the dry portion of the summer to obtain the best fracturing of tight soils. The fallow period also would allow time for soil moisture recharge after the intensive tillage.

Crop rotation offers some opportunities for soil and water conservation practices and crop residue management. No-tilling the soybeans as well as the corn allows some corn residue to be carried over to help with erosion control after soybean production. In furrow irrigation, the reduced amount of residue after soybeans helps improve water management compared to continuous corn production. In both cases, the reduced tillage with the crop rotation saves the producers fuel and labor.

**Paul Jasa**  
Extension Engineer

## Crop Watch on the web

**Remember:** *Crop Watch* is also available by subscription on the World Wide Web for a \$30 fee. The password-protected site includes the newsletter, weather and research updates, news stories, and special features.

## Rotation as a BMP reduces atrazine losses

Atrazine is undergoing a special EPA review to determine its risk to non-target plants and animals which are inadvertently exposed to it (mainly through water leaching and runoff). Atrazine is used on about 75% of our corn acreage at an average rate of 1.1 pounds active ingredient per acre. In the 8 million acres of corn grown in Nebraska, annual atrazine use is estimated at 6.6 million pounds. If 2% of the applied atrazine runs off into surface water, approximately

132,000 pounds enters our streams and lakes per year. Once deposited in water, atrazine degradation slows considerably, so a concerted effort is being made to reduce atrazine runoff and leaching.

A best management practice (BMP) to reduce atrazine runoff and leaching is to reduce the total application amount. The off-site movement will be lowered in direct proportion to the reduction in loading. A good way to do this is to rotate corn with another crop such

as soybeans, dry beans, alfalfa, or wheat. (Sorghum is excluded since atrazine is widely used in grain sorghum.) By employing other BMP's and reducing atrazine application amounts, atrazine runoff and leaching will be reduced. (See NebGuide G97-1323-A for *Best Management Practices to Reduce Atrazine Runoff from Corn Fields in Nebraska*.)

**Fred Roeth, Extension Weeds Specialist, South Central Research and Extension Center**

## Diversity improves weed management

A well designed crop rotation is an effective tool for weed management. The ideal rotation from the weed management standpoint would include row crops, small grains, and perennial forages such as alfalfa. The variation in timing of field operations and seasonal growth patterns of the different crops prevents any one weed from becoming dominant.

Summer annual weeds tend to be a problem in row crops but not in small grains or alfalfa. Winter annual weeds are a problem in winter wheat and sometimes alfalfa but not in row crops. Each crop possesses weed suppression characteristics. Alfalfa competes effec-

tively with most perennial and summer annual weeds. Wheat and other small grains effectively compete with summer annual weeds.

A diverse crop rotation including row crops, small grains, and forages is most effective in combating weeds. As crop diversity in the rotation is reduced, the benefits to weed management are reduced. Some of the most severe weed management problems occur under continuous corn or continuous wheat.

A rotation involving only summer seeded row crops offers a small advantage in weed management over monoculture from the

crop competition standpoint. However, such a rotation provides the opportunity to use different herbicides resulting in improved weed control compared to monoculture. It is important to take advantage of this opportunity to diversify the herbicide program.

Herbicide carryover is an issue that must be managed in a crop rotation. Certain herbicides can persist in the soil and injure rotational crops.

Plan ahead. Select herbicides that fit the planned crop sequence. Consult herbicide labels for rotation intervals and restrictions.

**Alex Martin  
Extension Weeds Specialist**

### Insect control *(Continued from page 93)*

Some corn insects may be more likely to occur under certain rotational systems. If corn follows small grains, or grassy pastures, white grubs or wireworms are more likely to occur than in continuous corn. A planter box insecticide treatment or a soil insecticide applied in-furrow at planting may be needed. Corn planted into recently killed alfalfa

may be more likely to be damaged by cutworms than in continuous corn. Fields should be scouted for cutworm damage starting at plant emergence, and if necessary a post-emergence insecticide applied. Even with these concerns, overall, for corn insect management, the benefits of rotation out of corn outweigh any liabilities of this

practice.

Additional information on the impact of rotations on crop insect management can be found in EC 95-1560, *Use of Cultural Practices in Crop Insect Pest Management*.

**Bob Wright, Extension Entomologist, South Central Research and Extension Center**

# Wheat field days scheduled for June 9-30

Many of the following locations will feature side-by-side comparisons of nearly 40 varieties/hybrids and a preview of your new choices. Crop production specialists and plant breeders will be present to discuss some of the best management practices for improving the competitiveness and profitability of Nebraska wheat production systems. Come share your experiences with wheat production and variety performance.

All tours are sponsored by NU Cooperative Extension Division. University of Nebraska variety perfor-

mance trials are supported in part by grower checkoff funds through a grant from the Nebraska Wheat Board.

For more information about any of these tours, contact the Extension Educator in the appropriate county or contact one of the specialists listed below, all of whom are cooperating in conducting the trials.

**Drew Lyon, Extension Dryland Crops Specialist**  
**Dave Baltensperger, Extension Crop Breeding Specialist**  
**Bob Klein, Extension Cropping Systems Specialist**  
**Lenis Nelson, Extension Agronomist**

## Wheat tour dates and locations

**Custer County**, 7 p.m. June 9, at John Beshaler farm, mile marker 259.7, 11 miles east of Arnold on Hwy 92.

**Keith County**, 10 a.m. June 10, at J. Welsh-L. Chandler farm, mile marker 137, northwest of Ogallala on Hwy 26.

**Perkins County**, 7 p.m. June 10, at Steve Tucker farm, mile marker 4.8, east of Venango on Hwy 23.

**Lincoln County**, 7 p.m. June 11, at West Central Center Dryland Farm, 2.5 miles south of the West Central Research and Education Center (near North Platte) on Hwy 83.

**Hitchcock County**, 10 a.m. June 12, at Brad Jesch farm, mile marker 22.3, 6 miles west of Trenton on Hwy 34.

**Furnas County**, 7 p.m. June 12, at Don Mues farm, mile marker 132.1, east of Arapahoe on Highways 34 and 6.

**Webster County**, 3 p.m. June 16, at Meredith Engelhardt farm, 5 miles south, .75 miles west of Bladen. Co-sponsored by Mid-Nebraska Water Quality Demonstration Project.

**Gage County**, 6:30 p.m. June 18, at Skip Barr farm, 3 miles south, 1.5 miles east of Hwy. 8 and Liberty Spur junction.

**Scotts Bluff County**, 10 a.m. June 19, at Ken Hall farm. Meet at Wheatland School. Co-Sponsored by Jiridon Agriculture.

**Thayer County**, 6:30 p.m. June 19, at Roger Bohling farm. Contact Steve Melvin, Thayer County Extension Office, or Roger Elmore, South Central Research and Extension Center, for location.

**Cheyenne County**, 9 a.m. June 26, at High Plains Agricultural Laboratory, 5 miles north of Sidney.

**Cheyenne County**, 3 p.m. June 26, Irrigated Trial, at Tim Maas Farm. 16 miles west northwest of Gurley.

**Morrill/Banner County**, 7 p.m. June 26, at Mike Chrisman farm, 4.5 miles south of McGrew on CR 34, 1 mile east.

**Sioux/Dawes County**, 10:30 a.m. June 27, at Howard Mazanec farm, mile marker 100 on Hwy 71, 2 miles east, 1 mile north.

**Box Butte County**, 2 p.m. on June 27, at Northwest Ag Lab, 3 miles northwest of Alliance on Hwy 2, 2 miles west, 0.5 mile north.

**Kimball County**, 6:30 p.m. on June 30, at Wes Phillips farm, 5 miles south of Kimball to Rd 20, 8 miles west, 4 miles south on Road 25.

## Wheat update

The storms last weekend and early this week gave the state's western wheat crop some much needed moisture, putting some areas slightly above 50% of normal rainfall.

A lot of tillers were dying back on the wheat because it was so dry. Wheat is heading out very short this year. One advantage of the dry conditions is that there were few summer annual weed problems.

**Bob Klein**  
**Extension Cropping Systems Specialist**  
**West Central Research and Extension Center**